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# मानक

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IS 1000 (1989): Milk and Milk Products - Lactose Commercial  
[FAD 19: Dairy Products and Equipment]



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“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*

**MILK AND MILK PRODUCTS — LACTOSE  
COMMERCIAL — SPECIFICATION**

*( First Revision )*

**भारतीय मानक**

**दुग्ध और दुग्ध उत्पाद — लैक्टोज, व्यावसायिक — विशिष्ट**

**( पहला पुनरीक्षण )**

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First Reprint JANUARY 1992

UDC 664.135

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**BUREAU OF INDIAN STANDARDS**  
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NEW DELHI 110002

## FOREWORD

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards on 25 January 1989, after the draft finalized by the Dairy Products Sectional Committee had been approved by the Agricultural and Food Products Division Council.

Lactose is manufactured from the whey remaining after the manufacture of casein, cheese or *chhana* from milk. The whey is acidified, if not already acidic; heated to boiling and filtered. The clear liquid is concentrated in vacuum pans at about 60°C until the solid content is about 60 percent when the crystallization is allowed to take place. The first crop of crystals is drained in a hydro-extractor and refined by recrystallization in the presence of a little bone black.

Lactose finds its use in dietary foods and pharmaceutical products, and has been found specially useful in penicillin production as a constituent of the fermentation medium. This standard mainly covers commercial lactose used in dietary foods and for the production of penicillin.

This standard was first published in 1959, keeping in view the manufacturing, trade and technological procedures followed in the country at that time.

The standard has now been revised and updated to bring the requirements in line with the International Codex Standard for Lactose ( Codex Standard 11-1981 ) published by the Codex Alimentarius Commission. In this revision, the requirement for lactose has been revised and those for ash, acidity and fat have been deleted and the requirements for pH, sulphated ash and moisture have been introduced. The requirement for lead ( Pb ) has also been modified. Since the product finds a good use in confectionary, microbial requirements have also been introduced.

While formulating this standard, due consideration has been given to the relevant Rules prescribed by the Government of India under the *Prevention of Food Adulteration Act, 1954* and the *Standard of Weights and Measures ( Packaged Commodities ) Rules, 1977*. This standard is however, subject to the restrictions imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( revised )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## Indian Standard

# MILK AND MILK PRODUCTS — LACTOSE COMMERCIAL — SPECIFICATION

( First Revision )

### 1 SCOPE

This standard prescribes the requirements and the method of test for commercial lactose. It does not cover lactose used in pharmaceutical products.

### 2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard.

IS No.	Title
IS 460 ( Part 1 ) : 1985	Specification for test sieves: Part I Wire cloth test sieves ( <i>third revision</i> )
IS 1070 : 1977	Specification for water for general laboratory use
IS 1479 ( Part 2 ) : 1961	Methods of test for dairy industry : Part 2 Chemical analysis of milk
IS 1679 : 1960	Method for determination of moisture content in milk powder and similar products
IS 5887 ( Part 1 ) : 1976	Methods for detection of bacteria responsible for food poisoning: Part 1 Isolation, identification and enumeration of <i>Escherichia coli</i> ( <i>first revision</i> )
IS 5887 ( Part 3 ) : 1976	Methods for detection of bacteria responsible for food poisoning : Part 3 Isolation, identification of <i>Salmonella</i> and <i>Shigella</i> ( <i>first revision</i> )
IS 11623 : 1986	Method for determination of moisture content in milk powder and similar products

### 3 REQUIREMENT

#### 3.1 Description

The material shall be obtained from the whey of milk of cow or buffalo or mixture thereof. It shall be in the form of a crystalline powder, white to

pale yellow in colour, nearly odourless, free from dirt or other foreign matter. It shall not be musty or rancid.

#### 3.2 Particle Size

The material shall pass through a 250  $\mu\text{m}$  IS sieve [ *see* IS 460 ( Part 1 ) : 1985 ].

3.3 The material shall also comply with the requirements given in Table 1.

### 4 PACKING AND MARKING

#### 4.1 Packing

The material shall be packed in clean and sound, tin or glass containers or cardboard cartons or paper bags in such a way as to protect it from deterioration. If packed in cardboard cartons or paper bags, there shall be a lining of polyethylene or grease proof paper.

#### 4.2 Marking

The following information shall be marked legibly and indelibly on each container:

- a) Name of the material,
- b) Name of the manufacturer,
- c) Batch or code number,
- d) Net weight, and
- e) Any other requirement under the *Standards of Weights and Measures (Packaged Commodities) Rules, 1977*.

### 5 SAMPLING

Representative samples of the product shall be drawn and tested for conformity to this standard as prescribed in Annex C.

### 6 TESTS

6.1 Tests shall be carried out as prescribed in the appropriate Annexes and Indian Standards given in col 4 and 5 of Table 1.

#### 6.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water ( *see* IS 1070 : 1977 ) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the result of analysis.

Table 1 Requirements for Lactose, Commercial

( Clause 3.3 )

Sl No.	Characteristic	Requirement	Method of Test, Ref to Annex of	
			This Standard	Other Indian Standards
(1)	(2)	(3)	(4)	(5)
i)	Lactose ( on dry basis ), percent by mass, <i>Min</i>	99.0	—	13 of IS 1479 ( Part 2 ) : 1961
ii)	Moisture, percent by mass, <i>Max</i>		—	IS 11623 : 1986
	a) For lactose, monohydrate	5.5		
	b) For lactose, anhydrous	1.0		
iii)	Sulphated ash ( on dry basis ), percent by mass, <i>Max</i>	0.2	—	Appendix G of IS 1679 : 1960
iv)	pH ( of 10 percent solution )	4.0-6.5	A	
v)	Specific rotation	52.0-52.6	B	
vi)	Nitrogen, percent by mass, <i>Max</i>	0.05	—	7 of IS : 1479 ( Part 2 ) : 1961
vii)	Arsenic ( As ) mg/kg, <i>Max</i>	1	—	Appendix J of IS 1679 : 1960
viii)	Lead ( Pb ) mg/kg, <i>Max</i>	2	—	Appendix K of IS 1679 : 1960
ix)	<i>E coli</i> , per 0.1 g	Absent	—	IS 5887 ( Part 1 ) : 1976
x)	<i>Salmonella</i> , per 0.1 g	Absent	—	IS 5887 ( Part 3 ) : 1976

## ANNEX A

[ Clause 3.3, Table 1, Item ( iv ) ]

## DETERMINATION OF pH

## A-1 GENERAL

The pH of the commercial lactose is determined with a pH meter.

immediately before use. Redistill the water in an all-glass apparatus if the pH does not lie within this range.

## A-2 APPARATUS

A-2.1 pH Meter with Glass Electrode, capable of reading with an accuracy of  $\pm 0.01$ .

## A-3.2 Buffer Solutions

## A-2.2 Resistance glass glassware

## A-4 PROCEDURE

## A-3 REAGENTS

A-4.1 Standardize the pH meter with suitable buffer solutions. Rinse the electrodes with distilled water and leave for 5 minutes.

## A-3.1 Water

A-4.2 Measure the pH of 10 percent solution of lactose by immersing the electrodes in the solution and taking the reading after 5 minutes.

Use distilled water of pH 6.2 to 7.0. Boil it for about 10 minutes and cool to room temperature

A-4.3 Express the result as pH to the nearest 0.01 pH.

## ANNEX B

[ Clause 3.3, Table 1, Item ( v ) ]

## DETERMINATION OF SPECIFIC ROTATION

## B-1 PROCEDURE

Accurately weigh 10.00 g of the sample and dissolve it in a beaker in about 60 ml water. Cover with a watch glass and boil for 15 minutes. Allow to cool, add a few drops of dilute ammonium hydroxide of spgr 0.96 and make up to 100 ml in a volumetric flask. Measure the optical rotation at 20°C.

## B-2 CALCULATION

$$\text{B-2.1 Specific rotation, degree(s)} = \frac{100 a}{l c} \times \frac{100}{w}$$

where

 $a$  = observed optical rotation in degrees. $l$  = length of tube in decimetres, $c$  = weight in g of sample dissolved in 100 ml of water. $w$  = percentage of lactose in the material.

## ANNEX C

( Clause 5 )

## SAMPLING OF LACTOSE

## C-1 GENERAL REQUIREMENTS OF SAMPLING

In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

**C-1.1** Samples shall be taken in a protected place not exposed to damp air, dust or soot.

**C-1.2** The sampling instruments shall be clean and dry when used.

**C-1.3** Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument, and the containers for samples, from adventitious contamination.

**C-1.4** The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample.

**C-1.5** Each container shall be sealed air-tight after filling, and marked with full details of sampling, date of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

**C-1.6** Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

**C-1.7** Sampling shall be done by a person agreed to between the purchaser and the vendor, and in the presence of the purchaser ( or his representative ) and the vendor ( or his representative ).

## C-2 SCALE OF SAMPLING

## C-2.1 Lot

All the containers in a single consignment of the

material drawn from a single batch of manufacture shall constitute the lot. If the consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

## C-2.2 Gross Sample

For the purpose of drawing samples for tests, a number of containers shall be selected at random from a lot. This number of containers in relation to the size of the lot, or the scale of sampling, shall be subject to an agreement between the purchaser and the vendor. As a guide to such an agreement, a scale of the size of the sample is suggested in Table 2.

**Table 2 Minimum Number of Containers to be Selected for Sampling from Various Sizes of Lots**

( Clause C-2.2 )

Lot Size	Sample Size
(1)	(2)
2 to 8	2
9 to 27	3
28 to 64	4
65 to 125	5
126 to 216	6
217 to 343	7
344 to 512	8
513 to 729	9
730 to 1 000	10
1 001 to 1 331	11



### **C-3 TEST SAMPLES AND REFEREE SAMPLE**

#### **C-3.1 Preparation**

To prepare a set of test samples, draw with an appropriate sampling instrument, from each container in the gross sample, not less than 0.75 kg of the material and mix thoroughly to form a composite sample of that container. Divide the composite sample of each container into three equal parts, each being a reduced sample for that container. A set of such reduced samples, consisting of one reduced sample from each container, shall constitute the test sample.

**C-3.2** Three sets of test samples, each sample being not less than 0.25 kg, shall be transferred immediately to thoroughly clean and dry containers, and sealed air-tight. These shall be labelled with particulars given in C-1.5. One set of test samples shall be sent to the purchaser and one to the vendor.

#### **C-3.3 Referee Sample**

The third set of test samples, bearing seals of the purchaser and the vendor, shall constitute the referee sample, to be used in case of dispute between the purchaser and the vendor. It shall be

kept at place agreed to between the purchaser and the vendor.

### **C-4 TEST FOR CONFORMITY**

#### **C-4.1 Examination and Tests**

The purchaser may examine and test each of the reduced samples constituting a test sample separately for compliance with the requirements of this standard or he may prepare, for the purpose of such examination, and at any stage of the progress of the examination, a composite samples representative of the whole lot, by mixing all the reduced samples constituting the test sample.

#### **C-4.2 Criterion for Conformity**

If, on examination and testing, all the individual reduced samples in a test sample or the composite sample are found to comply with the requirements of this standard, the lot shall be considered to have conformed to this specification. If some of the individual reduced samples do not comply with the requirements of this standard and the results vary from one reduced sample to another, the criterion for judging the quality of lot on the basis of results obtained shall be at the discretion of the purchaser unless otherwise previously agreed to between the purchaser and the vendor.

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Doc: No. AFDC 34 (3036)

#### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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